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from . . .

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Here is a copy of Murphy's reply to [redacted] regarding the 32 bit shift register. Info from a study of the minimal system (6E) preliminarily indicates this approach would cost about 3-4 times AP one and require substantially more power (6200 watts versus 4100 - present system uses 3100). Will send comparison study tomorrow

[redacted]

Subject: Magnetic Core Storage Register Command System

1. The proposal has been evaluated to the extent that it can be established that the hardware is within the state of the art and could reasonably be expected to be designed, qualified and manufactured by a competent electronics company.

2. Impact on the vehicle (Agena) would be minimal. Six wires would be added to the Agena payload interface through a separate plug. These six wires would tie an existing digital decoder on the vehicle side of the interface to the payload command box on the payload side of the interface. No other vehicle subsystem would be effected. Operational procedures for commanding, tracking and receiving telemetry of the vehicle would remain unchanged since all vehicle functions would still be controlled by the H-timer in the same manner as now.

3. The one outstanding technical question that cannot be answered at this time is the potential emi effect on the proposed system because of radiating portions of the payload and/or Agena. Unfortunately the full answer to this question will not be available until a completed command unit is integrated into the total system under simulated flight conditions. If emi problems develop, and corrections could be made by shielding the memory core, the impact would be minimum. However, if changes had to be made to payload or Agena subsystems, then the required fixes would have a major impact.

4. A prime system consideration in accomplishing a modification of this nature is the ability to revert to the old system in case major problems develop. The proposal will meet this requirement if the present design goal is strictly followed. All hardware changes (other than wiring) should be confined to the

command box located in the payload area. The interface of this box to the vehicle and to the rest of the payload should remain essentially unchanged. If this concept is followed, old and new command systems could be interchanged and the vehicle and the remaining part of the payload would not know the difference. The proposal also contains a magentic core by-pass capability which would revert to the use of the H-timer tape with a reduced capability in case command verification is not received.

5. Major changes would be required to the SCF software in order to convert some of the commanding from analog to digital form. It would be necessary to develop a command generation and command verification program on the scf computers. The estimated cost of this is 50k and the lead time about 13 M[illegible]. Since it is anticipated that a new command load would be inserted each acquisition, one of the scf computers would be tied up full time during the on-orbit portion of the mission. This could result in conflict for computer time in the event that more than one vehicle is on-orbit at the same time.

6. At the present time selection by

must be received at the scf at station acquisition minus 20 minutes. The proposed command system may increase this lead by 20 to 30 minutes. The best estimate now is that the 45 minutes would be required for the scf computer to generate the command, transmit to the RTS , command the vehicle and receive command verification.

7. The major change operationally is that people would be eliminated from command generation on this parts of the system controlled by the magnetic core ~~x~~ storage system. Command generation, commanding and verification will be

by computers with no check by people. It should be pointed out that an increase of flexibility is obtained with this system. But the increase should be considered more in the terms of 10 percent to 15 percent improvement rather than some very large amount.

8. Some management arrangements would have to be made to determine who generates what portion of the software, particularly in the command generation area. However, it is quite apparant that the scf computers must have the capability to generate and verify command data.

9. In summation, the incorporation of the command system is technically feasible while the emi is still an unknown factor. Because interchangability of the old and new systems as well as a backup mode exist, total system reliability should not be decreased. The required software can be generated, however increased demand will be made on scf computer capability.

It is further anticipated that the

earlier than at the present time. Some managements agreements must be reached as to location at which certain software will be generated.

10. The decision to proceed further with this proposal should primarily be based upon a requirement for a limited increase in flexibility as opposed to the dollar cost in achieving this flexibility.